

**OPTICAL RECORDING MEDIUM**

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**Abstract**

**PROBLEM TO BE SOLVED:** To display a label even if it is not directly printed on a surface, increase strength against contamination due to external deposit or the like, and prevent medium weight from being biased due to printing by providing a recording and reflection layers on a transparent substrate with a group and sequentially stacking a label recording layer and the transparent substrate that are decomposed or deteriorated when light is absorbed on the reflection layer.

**SOLUTION:** A recording layer for absorbing a laser beam directly or via another layer is provided on a transparent substrate 1 with a group and a metal reflection layer is provided on the recording layer directly or via another layer, and a label recording layer that is decomposed or is deteriorated at least when light is absorbed and a transparent substrate 2 are sequentially stacked on the reflected layer. A label recording beam such as laser beams and ultraviolet rays is applied from the side of the transparent substrate 2 for causing change in the label recording layer, thus creating a label in the label recording layer. Since the label recording layer is protected by the transparent substrate 2, it cannot be affected by an external deposit or the like.

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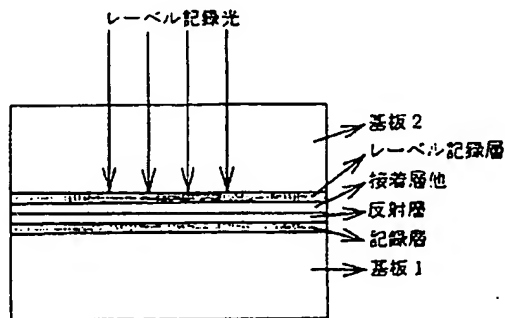
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(54) 【発明の名称】 光記録媒体

(57) 【要約】

【解決手段】 グループを有する透明な基板1上に直接又は他の層を介してレーザー光を吸収する記録層、該記録層の上に直接又は他の層を介して金属の反射層を有し、該反射層の上に少なくとも光を吸収すると分解あるいは変質するレーベル記録層および透明な基板2とを順次積層した光記録媒体。

【効果】 DVD-R等における貼り合わせ型片面記録タイプの光記録媒体において直接表面に印刷しなくともレーベル表示を可能にし、外部からの付着物等による汚れに強く印字による媒体重量の片寄りが無い光記録媒体が得られる。



## 【特許請求の範囲】

【請求項1】 グループを有する透明な基板1上に直接又は他の層を介してレーザー光を吸収する記録層、該記録層の上に直接又は他の層を介して金属の反射層を有し、該反射層の上に少なくとも光を吸収すると分解あるいは変質するレーベル記録層および透明な基板2とを順次積層した光記録媒体。

【請求項2】 基板2がグループ形状を持ち、かつ基板1と基板2のグループ形状が異なることを特徴とする請求項1に記載の光記録媒体。

【請求項3】 基板2がグループを持たないことを特徴とする請求項1に記載の光記録媒体。

## 【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は貼り合わせ型の光記録媒体において、レーベルを表面に直接印刷せずにレーザー光等の光により媒体内部に印字を可能にする光記録媒体に関する。

【0002】

【従来の技術】 通常、表面に印刷できるタイプのCD-R等の光記録媒体においては表面にプリンタブル層を有し、その表面に直接インクジェットプリンタ等によりレーベル印刷を行う。ところが、このような方式の場合レーベル印刷面が表面にむき出しになっており、手で直接振れたり誤って飲料等が付着すると印刷面の汚みや汚れが生じるといった点で好ましくない。また、レーベル印刷が媒体のある部分に集中すると媒体重量のバランスが悪くなり、高速読みだしタイプのドライブで不都合が生じる可能性がある。片面記録タイプのDVD-Rは基本的に0.6mm基板の上に有機色素、反射層を成膜した媒体に0.6mmの基板を貼り合わせている。よって、片面記録タイプのDVD-Rにおいてもレーベル印刷は媒体の表面に直接行うしか方法はなく、上記した問題点は何等解決されない。また、片面記録タイプのDVD-RAMも同じである。

【0003】

【発明が解決しようとする課題】 本発明の目的は、DVD-R等における貼り合わせ型片面記録タイプの光記録媒体において直接表面に印刷しなくともレーベル表示を可能にし、外部からの付着物等による汚れに強く印字による媒体重量の片寄りが無い光記録媒体を提供することにある。

【0004】

【課題を解決するための手段】 本発明者らは、上記課題を解決すべく鋭意検討を行なった結果、本発明を完成するに至った。即ち、本発明はグループを有する透明な基板1と透明な基板2の間に、少なくとも記録層、反射層及びグループ記録層を有する光記録媒体に関する。

【0005】

【発明の実施の形態】 本発明の具体的な構成について、以

下に説明する。本発明の光記録媒体の好ましい構成は、グループを有する透明な基板1上に直接又は他の層を介してレーザー光を吸収する記録層、該記録層の上に直接又は他の層を介して金属の反射層を有し、該反射層の上に少なくとも光を吸収すると分解あるいは変質するレーベル記録層および透明な基板2とを順次積層した構成のものである。図1に本発明の好ましい光記録媒体の基本的な断面図を示す。

【0006】 レーベル記録層が無ければ通常の片面記録タイプの光記録媒体であるが、レーベル記録層を設けることによって媒体作製後、一般ユーザーが任意に透明基板2側からレーザービームまたは紫外線等のレーベル記録光を照射することでレーベル記録層に変化を起こさせレーベルを作製する事が可能となる。レーベル記録層は、媒体の内部にあり記録層同様、透明基板に保護されているため外部からの付着物等による影響を全く受けない。万一、基板表面が汚れても拭き取る事で対処が可能である。また、光によるレーベル記録層の変化において基本的に重量変化は起こらないので、媒体のある部分に記録が集中しても媒体重量のバランスは一定で、高速読みだしタイプのドライブに対しても問題が起こりにくい光記録媒体である。

【0007】 また、基本的に基板2は基板1と同じものでも良いが、グループはなくても良い。必要であれば基板2にあらかじめ任意のデザインの溝を設け、意匠性を持たせる事も可能である。

【0008】 基板1及び基板2としては、例えばアクリル系樹脂、ポリカーボネート系樹脂、ポリオレフィン系樹脂等の公知の樹脂基板が挙げられる。記録層としては、一般に有機色素や相変化無機材料が挙げられる。有機色素の具体例としては、ポルフィリン系色素、シアニン系色素、アゾ系色素、ジピロメテン系色素、ポリメチン系色素、ナフトキノロン系色素が挙げられる。相変化無機材料の具体例としては、Ge、Sb、Teを主原料とする合金材料や、Ag、In、Sb、Teを主原料とする合金材料が挙げられる。

【0009】 反射層としては、金、銀、アルミニウム、銅、白金等の金属や、これらの金属を含有する合金が用いられる。記録感度や反射率、繰り返し記録特性の改善のために基板1と記録層や記録層と反射層の間にZnSやSiO<sub>2</sub>、SiN等の無機誘電体層やポリマーからなる層を設けても良い。

【0010】 レーベル記録層の材料としては記録光に対する感度や記録後のコントラストにより選択され、上記した記録層に用いられる有機色素や相変化無機材料の他にロイコ染料等の感熱材料（インク）やビスフェノールA等の顔色剤を用いることができ、更にこれらの材料を混合して用いることもできる。また、成膜法については材料により最適な方法が選択されるが、具体的には真空蒸着法、スパッタ法、スピンコート法、ディップコー

ト法、スプレーコート法、ロールコート法、スクリーン印刷法等の公知の方法が挙げられる。

【0011】また、コントラストや感度改善等の為にレーベル記録層に隣接して金属や無機誘電体、ポリマーなどの層を設けることも可能である。さらに、直接またはこれらの層を介して互いに異なる種類のレーベル記録層を設けることで多色化などの機能性を付与することもできる。本発明は記録媒体側つまり基板1側にある記録層材料、反射層材料やさらに層構成によっては何等限定されない。

【0012】

【実施例】以下、実施例により本発明を具体的に説明するが、本発明の実施の態様はこれにより限定されるものではない。厚さ0.6mm、直径120mmのスパイラル状のグループを有する射出成形ポリカーボネート基板のグループを有する面に、記録層としてアゾ色素を成膜した。この記録層の上に反射層として銀薄膜をスパッタ法により成膜した。一方、厚さ0.6mm、直径120mmのグループを持たない射出成形ポリカーボネート基板に感熱材料とシアニン色素を含有するレーベル記録層を成膜後、アルミニウ

ム薄膜を積層した。これら2つの基板を接着剤を用いて貼り合わせ光記録媒体を作製した。レーベル記録層側の基板から収束した波長780nmのレーザービームを照射することにより高いコントラストでレーベルを記録することができた。また、本媒体において、DVDで用いられる8-16変調記号を記録後、レーベル層の半分だけを全て記録した。この媒体を録速35m/s(10倍速相当)で回転させて波長653nmの半導体レーザーを搭載した再生装置で再生を行なったところ、良好に信号が読み出せた。

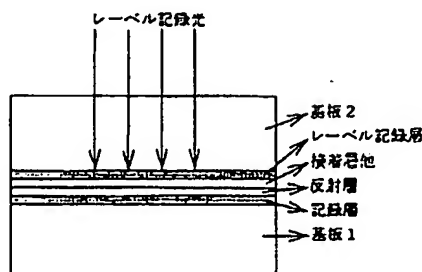
【0013】

【発明の効果】本発明によればDVD-R等における貼り合わせ型片面記録タイプの光記録媒体において直接表面に印刷しなくともレーベル表示を可能にし、外部からの付着物等による汚れに強く印字による媒体重量の片寄りが無い光記録媒体が得られる。

【図面の簡単な説明】

【図1】本発明に係る光記録媒体の層構成の一例を示す断面図である。

【図1】



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(54) Title of the Invention: OPTICAL RECORDING MEDIUM

(57) Summary

(Solution Means)

An optical recording layer, absorbing laser light directly on a transparent substrate or by a groove or via another layer, provided with a metal reflection layer directly on the

recording layer or via another layer, and a label recording layer that is decomposed or deteriorated at least when light is absorbed on the reflection layer and a transparent substrate 2 are provided in a sequentially stacked optical recording medium.

(Effect)

A recording medium is obtained free of bias that can be caused by the weight of the medium during heavy printing or by contamination from outside, making it possible to display a label without printing directly to the surface of an optical recording medium of the single-sided, attached recording medium in a DVD-R or the like.

[figure]

↓↓↓↓↓

label recording light

- substrate 2
- label recording layer
- direct attachment layer foundation
- reflection layer
- recording layer
- substrate 1

(Scope of the Patent's Claims)

(Claim 1)

An optical recording medium, having a recording layer absorbing laser light directly on an opaque substrate 1 having a groove or via another layer, and a metal reflection layer, provided directly on the recording layer or via another layer;

wherein a sequential stacked layer construction is created, comprising a label recording layer, decomposed or deteriorated by absorption of light at least on the reflection layer, and an opaque substrate 2.

(Claim 2)

The optical recording medium described in claim 1, characterized by the fact that the substrate 2 has a groove shape, and a different groove shape is created in the substrate 1 and in the substrate 2.

(Claim 3)

The optical recording medium described in claim 1, characterized by the fact that the substrate 2 does not have the groove shape.

(0001)

(Sphere of Technology Belonging to the Invention)

This invention relates to an optical recording medium that makes it possible to write to the inner part of the medium with light such as laser light, without printing directly to the surface of the label, in a recording medium of the laminated type.

(0002)

(Prior Art)

Printing to a label is normally performed with an inkjet printer etc., directly to the surface of an optical printing medium such as a CD-R or the like, enabling printing on the surface thereof, which is provided with a printable layer. Incidentally, when a similar method is used, because the printing surface of the label is bare, if this surface is touched by hand or drink or another contaminant adheres to it by mistake, this can cause soiling or contamination of the printing surface, which is not desirable. In addition, when the printing is concentrated in a certain part of the medium, this causes a poor balance of the weight of the medium and this can result in errors on the drive during reading at high speeds. A DVD-R of the single-sided recording type is essentially created with a structure wherein an organic pigment layer is attached to a 0.6 mm substrate, and a medium formed as a film containing a reflection layer is attached to the 0.6 mm substrate. Therefore, since only the direct method can be used on the surface of the medium during printing of a label of the single-surface recording type of a DVD-R, the above mentioned problems remain unresolved and the same is true also about DVD-RAM of the single-sided recording type.

(0003)

(Problem To Be Solved By This Invention)

The purpose of the present invention is to provide an optical recording medium enabling to display a label without printing directly to the surface of a recording medium of the one-sided recording type, attached to a DVD-R or the like, and that is free of bias caused by the medium weight during heavy printing and by contamination from outside of adhering matter.

(0004)

(Means To Solve Problems)

The present inventors arrived at a perfection of the present invention as a result of

intensive research aimed at a resolution of the problems mentioned above. Specifically, the present invention relates to an optical recording medium having at least a recording layer, a reflection layer, and a groove recording layer between an opaque substrate 2 and an opaque substrate 1 having a groove.

(0005)

(Embodiment Mode of the Invention)

The following is a concrete explanation of the concrete construction of this invention. In a preferable construction of the optical recording medium of this invention, a construction comprising sequentially stacked layers is created having a recording layer absorbing laser light deployed directly or via another layer on an opaque substrate 1 having a groove, as well as a metal reflection layer, deployed directly on the recording layer or via another layer, so that the light is absorbed at least on the reflection layer, causing decomposition or deterioration of the recording layer with an opaque substrate 2. Figure 1 shows a basic cross-sectional view of a preferable recording medium of this invention.

(0006)

If a label recording layer is not present, a common single-sided recording type of optical recording medium is used. However, when the label recording layer is deployed, after the medium has been manufactured, a user can create any label by causing changes in the label recording layer through irradiation with label recording light such as laser beam with ultraviolet rays or the like from the side of the opaque substrate 2. Because the label recording layer is a recording layer contained inside the medium, the layer is protected by the opaque substrate and it is thus unlikely the influence would be exerted by adhering matter or the like from outside. In the unlikely case that this does occur, the surface of the substrate can be wiped off or a corresponding measure can be taken. In addition, since essentially no medium weight fluctuations will be caused by changes caused in the label recording layer by the light, the balance of the medium weight is constant even if recording is concentrated only in a certain part of the medium, so that this medium makes problems of the type when a drive is read at a high speed unlikely to occur.

(0007)

Also, although the substrate 2 can use essentially the same design as the substrate 1, a groove is not necessarily required. When necessary, a groove can be created with any design ahead of time on the substrate 2, which can be provided with suitable design characteristics.

(0008)

For the substrate 1 and substrate 2 can be used for example an acrylic resin, a polycarbonate resin, a polyolefin resin or other examples of well known resin substrates can be



named. Examples of materials that can be used in the recording layer generally include organic pigments and materials, as well as phase changing inorganic materials. Concrete examples of organic pigments include porphyrin-based pigments, cyanine-based pigments, azo-based pigments, dipyrromethene-based pigments, polymethine-based pigments, naphthoquinone-based pigments, and other examples can be named. Concrete examples of phase changing inorganic materials include metal alloys having as a principle material Ge, Sb, Te, or metal alloys having as a principle material Ag, In, Sb, Te and other examples can be named.

(0009)

For the reflection layer can be used gold, silver, aluminum, copper, platinum or a similar metal or an alloy containing these metals can be used. In order to improve the recording sensitivity and the reflectance as well as the repeating recording characteristics of the layer, it is possible to employ between the substrate 1 and the recording layer or between the recording layer and the reflection layer a layer comprising ZnZ or SiO<sub>2</sub>, SiN or a similar inorganic dielectric layer, or a polymer or the like.

(0010)

By selecting the sensitivity to recording light of the material in the label recording layer and the contrast after the recording, it is possible to use a developer such as bisphenol, or a thermosensitive material (ink) such as a leuco pigment in addition to the organic pigment or inorganic phase changing material employed in said recording layer. Moreover, these materials can be also used mixed. The most suitable film formation method should be selected depending on the material. Concrete examples includes the vacuum vapor deposition method, sputtering method, spin-coating method, dip-coating method, spray-coating method, roll-coating method, screen printing method and examples of other well known methods can be named.

(0011)

Further, it is also possible to employ a layer comprising a metal, an inorganic dielectric, a polymer or the like, adjacent to the label recording layer in order to improve the contrast and the sensitivity and other characteristics. Furthermore, it is also possible to impart characteristics such as multicolor changes by using different types of label recording layers, either directly or via respective layers. Also, the present invention is not limited to a layer construction on the side of the recording medium, that is to say to the construction comprising a recording layer material and reflection layer material on the side of the substrate 1.

(0012)

(Embodiment)

Although an embodiment was used for a concrete explanation of the present invention, this invention is not limited by this embodiment mode. A film was formed containing an azo dye as a recording layer on a surface having a groove on a polycarbonate substrate formed by injection molding, with a groove having a spiral shape and a diameter of 120  $\mu\text{m}$ , and with a layer thickness of 0.6  $\mu\text{m}$ . A thin silver film was formed with the sputtering method as a reflection layer on top of this recording layer. Also, after a label recording layer film was formed containing a cyanine pigment and a thermosensitive material on a polycarbonate substrate formed with injection molding which did not have a groove with a diameter of 120  $\mu\text{m}$ , with a layer thickness of 0.6  $\mu\text{m}$ , an aluminum thin film layer was created in the stacked layer construction.

An optical recording medium was then attached by using an adhesive to these two substrates. This made it possible to perform label recording operations with a high contrast through irradiation with laser beams having a wavelength of 780 nm focused from the substrate on the side of the label recording layer. In addition, after recording was used with the 8-16 modulation designation in a DVD, recording was conducted only in one half of the label layer. When the recording medium was rotated with a linear speed of 35 m/s (corresponding to a speed coefficient of 10) and playback was performed with a playback device using a semiconductor laser with a wavelength of 653 nm, this made it possible to achieve continuous output of optimal signal.

(0013)

The present invention makes it possible to display a label without printing directly to the surface on an optical recording medium of the single-sided recording type, which can be attached to a DVD-R or the like. This enables to obtain a recording medium that is free of bias caused by the medium weight or by heavy printing, and that is free of contamination from outside, caused by adhering matter or the like.

(Brief Explanation of Figures)

(Figure 1)

A cross-sectional view showing one example of the layer construction in a recording layer medium of this invention.

(Figure 1)

↓↓↓↓↓

label recording light

- substrate 2
- label recording layer
- direct attachment layer foundation
- reflection layer
- recording layer
- substrate 1

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